

Instructions: Legibly complete each of the following on lined paper and submit on Gradescope. Collaboration and outside help (in any form) are forbidden.

- Consider the matrix $M = \begin{bmatrix} 1 & 3 & -3 \\ -2 & -1 & -4 \\ -1 & -4 & 5 \end{bmatrix}$.
 - Compute the characteristic polynomial of M .
 - Compute the eigenvalues of M .
 - Compute a basis of eigenvectors for each eigenspace of M .
- Compute the eigenvalues of $M = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$. Is M diagonalizable? Explain why or why not.